

WHAT IS CLAIMED IS:

1. A fuse comprising:

an electrical assembly comprising two electrical contacts accessible from an exterior
5 of a fuse and a fuse element in contact with the two electrical contacts; and

a fuse tube assembly comprising a support structure surrounding at least a portion of
the electrical assembly and a reinforcing structure formed over the support structure and in
contact with at least a portion of the electrical assembly, wherein the reinforcing structure
comprises a fiber matrix pre-impregnated with a resin.

2. The fuse of claim 1 wherein the fuse comprises a current limiting fuse.

3. The fuse of claim 1 wherein the fuse element extends between the contacts.

4. The fuse of claim 1 wherein the fuse tube assembly extends between the contacts.

5. The fuse of claim 1 wherein an inside surface of the support structure overlaps a
portion of an outside surface of each of the electrical contacts.

6. The fuse of claim 1 wherein the fiber matrix comprises a pre-woven fabric.

7. The fuse of claim 6 wherein the fibers in the pre-woven fabric are oriented in a
predetermined orientation.

8. The fuse of claim 1 wherein the support structure comprises a pre-formed tubular
structure.

9. The fuse of claim 8 wherein the pre-formed tubular structure comprises a
composite material.

10. The fuse of claim 8 wherein the pre-formed tubular structure has a slit extending from a first end of the structure to a second end of the structure.

5 11. The fuse of claim 1 wherein a thickness of the support structure is greater than a thickness of the reinforcing structure.

12. The fuse of claim 1 wherein the fuse tube assembly further comprises a heat shrink structure formed over the reinforcing structure.

10 13. The fuse of claim 12 wherein the heat shrink structure is constructed of a material providing UV protection.

14. The fuse of claim 12 wherein the heat shrink structure comprises a pre-formed sleeve.

15 15. The fuse of claim 12 wherein the heat shrink structure comprises one or more strips of a heat shrink tape.

16. The fuse of claim 1 wherein the fiber matrix is applied circumferentially.

20 17. The fuse of claim 16 wherein the fiber matrix is applied circumferentially such that the fibers have a predetermined orientation at a predetermined angle with respect to an axis of the fuse.

25 18. The fuse of claim 1 wherein the fiber matrix is applied vertically.

19. The fuse of claim 18 wherein the vertical application comprises at least one piece of fiber matrix placed in a vertical orientation along an axis of the fuse.

20. The fuse of claim 18 wherein the vertical application comprises a single piece of fiber matrix placed in a vertical orientation along an axis of the fuse and having a sufficient width to cover the majority of an outer surface of the fuse.

5 21. The fuse of claim 1 wherein the reinforcing structure further comprises at least one layer of pre-impregnated fiber matrix applied circumferentially and at least one layer of pre-impregnated fiber matrix applied vertically.

10 22. The fuse of claim 1 wherein the reinforcing structure is configured to reinforce a selected portion of an area of the fuse along a lengthwise axis of the fuse.

23. The fuse of claim 22 wherein the selected portion of the area comprises less than all of the area.

15 24. The fuse of claim 22 wherein the selected portion of the area comprises an area excluding a portion of the outside surface of the electrical assembly.

25. A method of reinforcing a fuse, the method comprising:
 providing an electrical assembly, the electrical assembly comprising two electrical
20 contacts accessible from an exterior of a fuse and a fuse element in contact with the two electrical contacts;
 surrounding at least a portion of the electrical assembly by a support structure;
 applying a reinforcing structure over the support structure and in contact with at least
a portion of the electrical assembly, wherein the reinforcing structure comprises a fiber
25 matrix, the fiber matrix comprising fibers pre-impregnated with a resin.

26. The method of claim 25 further comprising applying a heat shrink structure over the reinforcing structure.

30 27. The method of claim 25 wherein applying the reinforcing structure comprises applying the pre-impregnated fiber matrix in a rolling operation.

28. The method of claim 25 wherein applying the reinforcing structure comprises applying the pre-impregnated fiber matrix in a wrapping operation.

5 29. The method of claim 25 wherein applying the reinforcing layer comprises circumferentially applying the pre-impregnated fiber matrix.

30. The method of claim 25 wherein applying the reinforcing layer comprises vertically applying the pre-impregnated fiber matrix.

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31. The method of claim 25 further comprising performing post application processing of the fuse.

32. The method of claim 31 wherein performing post application processing
15 comprises curing.

33. The method of claim 32 wherein curing the reinforcing fuse comprises heating the fuse.

20 34. The method of claim 33 wherein the fuse is heated to between approximately 250° F and 400° F.

35. The method of claim 25 further comprising pre-heating the electrical assembly.

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36. The method of claim 35 wherein the electrical assembly is pre-heated to between approximately 100° F and 200° F.

37. The method of claim 25 further comprising filling the fuse with an electrical
30 arc quenching medium.

38. A fuse comprising:

an electrical assembly comprising two electrical contacts accessible from an exterior of the fuse and a fuse element in contact with the two electrical contacts; and

5 a fuse tube assembly comprising a support structure surrounding at least a portion of the electrical assembly and a reinforcing structure formed over the support structure;

wherein the reinforcing structure comprises a resin composition of discontinuous fibers arbitrarily dispersed in an epoxy.

39. The fuse of claim 38 wherein the fuse comprises a current limiting fuse.

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